SURFACE-WAVES IN HETEROGENEOUS MEDIA

James T. Wilson

(Abstract)

Solutions have been obtained and dispersion-curves calculated for surface-waves of the Love and Rayleigh types in media in which the elastic constants are exponential functions of the depth. Both sets of waves show dispersion of the expected type and for oceanic paths the agreement between observed and calculated values is satisfactory.

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TRIALS OF GALVANOMETERS OF VARIOUS PERIODS WITH ELECTROMAGNETIC SEISMOMETERS

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(Abstract)

Galvanometers with a variety of periods have been tried with electromagnetic seismometers in order to extend the usefulness of the latter. It has been known for a long time that a filtering effect is obtained by the use of seismometer and galvanometer so that certain earth-vibrations are suppressed and others are magnified. The Benioff seismometer as usually employed is equipped with a short-period galvanometer with a period about a fifth of a second and a long-period galvanometer with a period of about a minute. Recording has been improved greatly by the use of three galvanometers, namely, the original short-period, a Leeds and Northrup Type-R with a period of 4.5 seconds, and a Leeds and Northrup Type-P ballistic with a period of 25 seconds.

It has been found possible to increase the effectiveness of the Galitzin-Wilip instruments in the same way. The horizontal seismometer has been used with its regular 14-second galvanometer and the 1/5-second at the same time; local earthquakes and blasts are recorded by the short-period while teleseisms are recorded on the longer-period galvanometer as usual. The 4.5-second galvanometer responds particularly well to the reflected phases of teleseisms when connected to the Galitzin vertical, at the same time that the 14-second galvanometer records all phases with unimpaired clearness. A Type-P student galvanometer has given excellent records on the Galitzin horizontal while connected in parallel with the regular 14-second galvanometer; it records both primary and secondary waves with exceptional clarity; its period is 6.5 seconds.

Microseismic disturbances on the 4.5- and 6.5-second galvanometers have been much less than anticipated; often the regular 14-second galvanometers of the Galitzins have been affected much more than these when connected to the same instruments.

Experiments are continuing with more galvanometers of different characteristics so that the whole range of periods may be investigated experimentally.

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PROGRESS-REPORT ON PERIODICITY AND TIME SERIES

Archie Blake

(Abstract)

Classical methods for detecting and measuring periodicity have suffered from two serious defects. First, the Schuster periodogram does not provide adequately for non-sinusoidal types of variation. Second, the smoothness encountered in almost all time series and many other types of data introduces a spurious appearance of periodicity which vitiates the test of significance unless proper allowance is made for the smoothness.

New statistics designed to detect effects not contemplated in the Schuster periodogram are being tried in a study of the series of aftershocks of the Helena, Montana, earthquakes of October, 1935. This work is being done by use of punched cards, which greatly alleviate the labor of the computation.